



STANFORD HUMAN GENOME CENTER  
STANFORD UNIVERSITY SCHOOL OF MEDICINE  
*HUMAN GENOME EDUCATION PROGRAM*  
<http://www-shgc.stanford.edu/bio-ed/>

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August 10, 1998

Daniel W. Drell, Ph.D.  
Human Genome Program  
Office of Health and Environmental Research  
19901 Germantown Road  
U.S. Department of Energy, Mail Stop ER-72 (GTN)  
Germantown, MD 20874-1290

RE: **Final Technical Report, DE-FG03-96ER62161**  
***Human Genome Education Program, Stanford Human Genome Center***

Dear Dr. Drell:

We apologize for the delay of this Final Technical Report on the DOE-funded Human Genome Education Program (HGE) at the Stanford Human Genome Center. The funds from the DOE Human Genome Program, for the project period 2/1/96 through 1/31/98, have provided major support for our curriculum development and field testing efforts for two high school level instructional units: Unit 1, *Exploring Genetic Conditions: Genes, Culture and Choices*; and Unit 2, *DNA Snapshots: Peeking at Your DNA*, which draft copies are enclosed.

In the original proposal, we requested DOE support for the partial salary and benefits of a Field Test Coordinator position to: (1) complete the field testing and revision of two high school curriculum units, and (2) initiate the education of teachers using these units. During the project period of this two-year DOE grant, a part-time Field-Test Coordinator was hired (Ms. Geraldine Horsma) and significant progress has been made in both of the original proposal objectives. This is documented below.

Field testing for Unit 1 has occurred in over 12 schools (local & non-local sites with diverse student populations). Field testing for Unit 2 has occurred in over 15 schools (local & non-local sites) and will continue in 12-15 schools during the '96-'97 school year. For both curricula, field-test sites and site teachers were selected for their interest in genetics education and in hands-on science education. Many of the site teachers had no previous experience with HGE or the unit under development.

Both of these first-year biology curriculum units, which contain genetics, biotechnology, societal, ethical and cultural issues related to HGP, are being implemented in many local and non-local schools

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Dr. Daniel Drell  
DOE Final Technical Report

(SF Bay Area, Southern California, Nebraska, Hawaii, and Texas) and in programs for teachers. These units will reach over 10,000 students in the SF Bay Area and continues to receive support from local corporate and private philanthropic organizations.

Although HGEP unit development is nearing completion for both units, data is still being gathered and analyzed on unit effectiveness and student learning. The final field testing result from this analysis will contribute to the final revisions of each unit during the second-year of this grant. Please find enclosed draft copies of these curricula and teacher professional development program agendas conducted with these units.

These DOE funds have supported Ms. Geraldine Horsma, High School Science Teacher, in her part-time position as Field Test and Outreach Coordinator at the Stanford Human Genome Center. This is a 40% FTE position. Through support from DOE, Ms. Horsma's primary responsibilities over the two-year grant period are to (1) bring to conclusion the classroom fielding testing of the two human genome curricula; and (2) conduct professional development workshops for teachers, administrators and scientists. In addition to these objectives, Ms. Horsma has helped build biotechnology and genome education partnerships in the S.F. Bay Area; and has designed and implemented a new summer high school course in the Palo Alto Unified School District on biotechnology and genome science. These subsequent activities strongly complement the grant objectives. Selected program agendas are enclosed.

Ms. Horsma continued her current position at HGEP (40% release time from her district), supported in-part by these DOE funds, through January 31, 1998. In the coming project year, Ms. Horsma will help finalize the two curriculum units, help conduct professional development programs locally and at national science education conferences (e.g., NABT, NSTA). Additionally, Ms. Horsma will contribute to student tours and internships at SHGC and help organize a new one-year high school course at Gunn High School in biotechnology, genetics and human choices.

Unit 2, *DNA Snapshots: Peeking at Your DNA*, requires informed consent from all instructional participants providing DNA samples. During the teaching of Unit 2, the informed consent process and informed consent form is discussed, reviewed and signed by those providing personal DNA samples. Enclosed is an updated Informed Consent form and a DNA Snapshot's, information form.

The Human Genome Education Program is initiating two efforts to supplement and extend DOE support. One is sponsored-implementation of curriculum and the other is commercial licensing of HGEP curriculum units.

The HGEP genome curricula, which are hands-on, inquiry-based and engages student interest, requires financial and material support in order to be initially implemented in schools and instructionally sustained in classrooms over time. As a first step in developing a sponsoring process for curriculum implementation for the genome curriculum, HGEP has received (through Stanford University) a grant for about \$70,000 in equipment, materials and personnel funds (20% coordinator position) from Applied Biosystems Division of Perkin Elmer Corporation (PE Applied Biosystems). This grant represents the first year of a multi-year commitment, and will support the implementation of PCR-based instruction within San Francisco Bay Area schools. The initial curriculum supported for implementation by PE Applied Biosystems is *DNA Snapshots, Peeking at Your DNA*, developed at the Stanford Human Genome Center through funding from NIH/NCHGR, DOE and PE Applied Biosystems.

Dr. Daniel Drell  
DOE Progress Report

The curricula produced by HGEP have education value to teachers attempting to implement biotechnology and genome education in grades 9-14, plus they have commercial value to publishers and biology education suppliers. HGEP and Stanford University will be exploring the licensing of the two HGEP curricula to publishers and/or suppliers for national dissemination. In licensing HGEP curricular products to commercial companies, new sources of revenue will be available to HGEP.

There are no unexpended funds anticipated to be left at the end of the current budget period. If we can provide any further information, please contact Lane Conn.

Sincerely,

*Richard M. Myers*

Richard Myers, Ph.D.  
Professor of Genetics,  
Stanford University Medical Center  
and Director, Stanford Human Genome Center

*Lane Conn*

Lane Conn  
Education and Outreach Director  
Stanford Human Genome Center

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Enclosed  
Appendices:

- (1) Unit 1, San Francisco Biotechnology workshop cover (June, '96)
- (2) Unit 1 at New Valley High School (October, '96)
  - Letter to parents from Jules Phinippidis, Principal
  - News article on Unit 1 in local Santa Clara Valley Weekly
- (3) Unit 2 Implementation, San Mateo County (academic year, '96-'97)
- (4) Unit 2 Workshop, California Science Teachers Assoc. (Oct. 4, '96)
- (5) Unit 2 Workshop, Nat. Assoc. of Biology Teachers (Oct. 18, '96)
- (6) Unit 2 Workshop, local S.F. Bay Area (Oct. 25-26, '96)
- (7) Unit 2 Workshop packet (ASHG, High School Teacher & Student)
  - American Society of Human Genetics (Oct. 29, '96)
  - Unit 2 Epilogue: The True Story, by Mary-Claire King.
- (8) Informed Consent form & Unit 2 Information Sheet
- (9) Unit 1, *Exploring Genetic Conditions: Genes, Culture and Choices* (draft)
- (10) Unit 2, *DNA Snapshots: Peeking at Your DNA* (draft)

cc: Karen Carpenter